CLAIMS:

1. A DNA sequence coding for oncofetal ferritin 1 (OFF1) protein selected from the group consisting of:

(i) a DNA sequence as depicted in Fig. 1;

(ii) a DNA sequence as depicted in Fig. 4;

(iii) a DNA sequence which codes for the same amino acid sequences of (i) or (ii);

(iv) fragments of any of the sequences of (i) to (iii) that code for a physiologically active protein;

(v) a DNA sequence that has at least 80% homology, as determined by hybridization under stringent conditions, to any one of the sequences of (i) to (iv) and code for a physiologically active protein; and

(vi) a DNA sequence that hybridizes to the sequences of (i) or (iv), under highly stringent conditions, being hybridization to filter-bound DNA in 0.5M $NaHPO_4$, 7% sodium dodecyl sulfate (SDS), 1mM EDTA at 65°C, and washing in 0.1xSSC/0.1% SDS at 68°C, which can either be used as a probe for OFF1, or which encodes functionally equivalent gene product; and

(vii) a DNA sequence that hybridizes to the sequences of (i) to (iv) under moderately stringent conditions, e.g., washing in 0.2xSCC/0.1% SDS at 42°C yet which still encodes a functionally equivalent gene product.

2. An expression vector comprising the DNA sequence of Claim 1.

3. An expression vector according to Claim 2, being a plasmid.

4. A genetically engineered host cell containing the DNA sequence of Claim 1, operatively associated with a regulatory element heterologous to the

DNA sequence which directs the expression of the DNA sequence by the host cell.

5. An amino acid sequence coded by the nucleic acid sequence of Claim 1.

6. A DNA sequence which is complementary to at least a portion of any one of the sequences of Claim 1, capable of being transcribed to mRNA which is an anti-sense to at least a portion of the mRNA transcribed by any one of the sequences of Claim 1, said portion being sufficient to inhibit translation of the mRNA to protein.

7. An anti-sense mRNA sequence transcribed from the DNA of Claim 6.

8. A pharmaceutical composition comprising the expression vector of Claim 3.

9. A pharmaceutical composition comprising the amino acid sequence of Claim 5.

10. A pharmaceutical composition according to Claims 8 or 9, for immunization against cancer.

11. A pharmaceutical composition according to Claim 10, for immunization against breast cancer.

12. A pharmaceutical composition according to Claims 8 or 9, for the treatment of transplant rejections, autoimmune diseases, pathological pregnancies and for enhancing fertilization rates during IVF treatment.

13. A pharmaceutical composition according to Claims 8 or 9 for use as a growth factor of bone-marrow progenitor cells.

14. A pharmaceutical composition according to Claim 13, wherein the cells are granulocyte monocytes.

15. A growth factor for bone marrow progenitor cells comprising as an active ingredient the amino acid sequence of Claim 5.

16. An expression vector comprising the DNA of Claim 6.

17. A pharmaceutical composition comprising the expression vector of Claim 16.

18. A pharmaceutical composition comprising the anti-sense mRNA sequence of Claim 6.

19. A pharmaceutical composition according to Claim 17 or 18, for the treatment of cancer.

20. A pharmaceutical composition according to Claim 19 for the treatment of breast cancer.

21. A pharmaceutical composition according to Claim 17 or 18, for the induction of abortion.

22. A method for the diagnosis of cancer comprising: detecting elevated to levels of mRNA transcribed from DNA sequences depicted in Fig. 1 or Fig. 4.

23. A method according to Claim 22, wherein the cancer is selected from the group consisting of: breast cancer, hepatoblastoma, leukemia, Hodgkin's and non-Hodgkin's lymphomas and embryonal tumors.

24. A method for the detection of Downs' Syndrome, comprising detecting elevated levels of mRNA transcribed from the DNA sequence of Fig. 1 or 4.

25. A method for the detection of pathological pregnancies comprising detecting decreased levels of mRNA transcribed from the DNA sequence of Fig. 1 or 4.

26. A method according to Claim 25, wherein the pathological pregnancy is selected from the group consisting of: spontaneous abortion and miscarriage, premature contractions, toxemia, premature delivery.

27. A method according to any one of Claims 22 to 26, wherein the level of the DNA expression is detected using RT-PCR.

28. A method for isolating the DNA sequence of Fig. 1 or 4, substantially as hereinbefore described.

29. Primers for use in the methods of Claims 27 or 28 selected from the group consisting of:

5′ GGT GGC GAC GAC TCC TGG AGC CCG 3′
5′ TTG ACA CCA GAC CAA CTG GTA ATG 3′
5′ GAC CGC GAT GAT GTG GCT TTG AAG AAC 3′
5′ GAT AGG ATC TTT AGC GAC AGC CGA 3′
5′ ATG GCG GCC TCT GAG TCC TGG TGG 3′
5′ CGG GCT GAA TGC AAT GGA GTG TGC 3′
5′ GAC CCC CAT TTG TGT GAC 3′
5′ CGA CGA CTC CTG GAG CCC G 3′
5′ Biotin-TTG ACA CCA GAC CAA CTC GTA ATG 3′
5′ AGC CGA CAG CGA TTT CTA GGA TAG 3′
5′ GTT CTT CAA AGC CAC ATC ATC GCG GTC 3′
5′ GCT TTC ATT ATC ACT GTC TCC CAG GGT G 3′
5′ CAG ACG TTC TTC GCC GAG AGT CGT 3′
5′ CAG ACG TTC TTC GCC GAG AGT CGT CGG 3′
5′ CAT TTC GGG GAT TCG GGG GA 3′
5′ GGG GGA CGG AAC CCG GCG CT 3′
5′ CCC TCT ACA CTT ATC ATC TTC 3′
5′ CTA TCC TAG AAA TCG CTG TCG GCT 3′
5′ GTC ACT ACT GGA ATT CCC TTC TCC 3′
5′ GGA GAA GGG AAT TCC AGT AGT GAC 3′
5′ GGA AAT CGC TGT CGC CTA ACC 3′
5′ GGT TAG GCG ACA GCG ATT TCC 3′
5′ GGC CAC GCG TCG ACT AGT AC 3′
5′ GTA ATG CAC ACTCCA TTG GC 3′
5′ GTA ATG CAC ACT CCA TTG 3′
5′ GCG CTC AGC TGG AAT TCC 3′
5′ GGA ATT CCA GCT GAG CGC 3′
5′ GTG GGA TCC CCA TGA CGA CCG CGT CCA CC 3′
5′ GAC TCG AGT TAA GCC GAC AGC GAT TTC 3′
5′ GAC TCG AGT CAG GGT GAC CGA AAA ATC AG 3′
5′ CCC GCT CGA GTC AGG GTG ACC GAA AAA TCA G 3′